07-19-00

A/R

Practitioner's Docket No. Clearstrm-6 ***PATENT***

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Date: July 17, 2000

Assistant Commissioner for Patents
Washington, D.C. 20231

REISSUE APPLICATION TRANSMITTAL

Transmitted herewith is the application for reissue of U.S.

☒ Utility Patent ☐ Plant Patent ☐ Design Patent

No. 5,785,854 issued on July 28, 1998.

Inventor(s): Jerry McKinney

Title: CURRENT AND AERATION SYSTEM FOR WASTEWATER PLANT

Enclosed are the following:

1. Specification, claim(s) and drawing(s), (37 C.F.R. § 1.173)

(a) ☐ 6 page(s), of specification.

☐ 5 page(s) of claims

☒ 1 page(s) of abstract

NOTE: This must include the entire specification and claims of the patent, with the matter to be omitted by reissue enclosed in square brackets. Any additions made by the reissue must be underlined, so that the old and new specifications and claims may be readily compared. Claims should not be renumbered. The numbering of claims added by reissue should follow the number of the highest numbered patent claim. No new matter shall be introduced into the specification. (37 C.F.R. § 1.173).

CERTIFICATION UNDER 37 C.F.R. § 1.10*
(Express Mail label number is mandatory.)
(Express Mail certification is optional.)

I hereby certify that this Reissue Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date July 17, 2000, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL362272395US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Jan C. Lipscomb
(type or print name of person mailing paper)

Jan C. Lipscomb
Signature of person mailing paper

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

***WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).*
*"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.*

(b) ☒ Three (3) sheet(s) of drawing (drawings amended)

☒ Formal

☐ Informal

NOTE: *"Amendments which can be made in a reissue drawing, that is, changes from the drawing of the patent, are restricted." 37 C.F.R. § 1.174(b).*

☒ No changes in the drawings, upon which the original patent was issued, are to be made. Therefore, in accordance with 37 C.F.R. § 1.174(a), please find attached, in the size required for original drawings:

☒ a copy of the printed drawings of the patent.

☐ a photoprint of the original drawings.

☐ A letter requesting transfer of the drawings from the original patent file to this reissue application is attached.

2. Declaration and power of attorney

☒ Five (5) pages of declaration and power of attorney

3. Preliminary amendment

(check, if applicable)

☒ Attached

4. Offer to surrender the original letters patent in accordance with 37 C.F.R. § 1.178 is attached.

☒ Offer to surrender is by the inventor

☐ along with assent of assignee.

☐ Offer to surrender is by the assignee of the entire interest (and the reissue application does not seek to enlarge the claims of the original patent).

5. Letters patent

☐ Original letters patent are attached.

☐ Declaration that original letters patent lost or inaccessible is attached.

☒ A copy of the original printed patent is attached.

NOTE: *"The application may be accepted for examination in the absence of the original patent or the declaration but one or the other must be supplied before the case is allowed." 37 C.F.R. § 1.178.*

NOTE: *"Where the original patent grant is not submitted with the reissue application as filed, patentee should include a copy of the printed original patent. Presence of a copy of the original patent is useful for the calculation of the reissue filing fee and for the verification of other identifying data." M.P.E.P., § 1416, 7th ed.*

NOTE: *"If a reissue be refused, the original patent will be returned to applicant upon his request." 37 C.F.R. § 1.178.*

6. Petition to proceed without assignee's assent

☐ Attached hereto is a "PETITION TO PROCEED WITH REISSUE APPLICATION WITHOUT ASSIGNEE'S ASSENT".

A. ☐ The fee payment is authorized in the attached:

☐ "REISSUE APPLICATION TRANSMITTAL" Form

☐ "COMPLETION OF FILING REQUIREMENTS — REISSUE APPLICATION" Form.

B. ☐ Payment is authorized below.

7. Information Disclosure Statement

☒ Attached

☒ Copies of the IDS citation(s) is/are attached.

8. Priority—35 U.S.C. § 119

☐ Priority of application Application No. 0 / _____, filed on _____, in _____ is claimed under 35 U.S.C. § 119.
Country

☐ The certified copy has been filed in prior application Application No. 0 / _____ filed on _____.

9. Basic Filing Fee Calculation (37 C.F.R. § 1.16(h), (i) and (j))

CLAIMS AS FILED					
Number Filed		Number Extra	Rate		Basic Fee (37 C.F.R. 1.16(h))
					$690.00
Total Claims (37 C.F.R. § 1.16(j))	24	– 20 *(and also in excess of total claims in patent)*	= 4 X $18.00	=	72.00
Independent Claims 37 C.F.R. § 1.16(i))	6 – 5	*–(number of independent claims in patent)*	= 1 X $78.00	=	78.00
		Filing fee Calculation		$	840.00

NOTE: Multiple dependent claims are treated as ordinary claims for fee purposes. 37 C.F.R. § 1.16(j).

10. Small Entity Status *(if applicable)*

NOTE: A new statement is required for the reissue, even if one has been filed in the original patent. 37 C.F.R. § 1.27(a).

WARNING: *"Small entity status must not be established when the person or persons signing the . . . statement can **unequivocally** make the required self-certification." M.P.E.P. § 509.03, 6th ed., rev. 2, July 1996 (emphasis added).*

☒ A statement that this filing is by a small entity is

☒ attached.

Filing Fee Calculation (50% of above) $447.00

NOTE: If a statement is filed within 2 months of the date of timely payment of a fee, then the excess fee paid will be refunded on request. 37 C.F.R. § 1.28(a). Effective April 1, 1984.

11. Additional Fee Payments

☐ Payment is being made for "PETITION TO PROCEED WITH REISSUE APPLICATION WITHOUT ASSIGNEE"
(37 C.F.R. § 1.17(h)) $130.00

12. Total Fees Due

Filing Fee		$420.00
Petition fee		$
	Total Fees Due	$420.00

13. Method Of Payment of Fees

☒ Enclosed is a check in the amount of $420.00.

☐ Charge Account No. _____ in the amount of $_____.
A duplicate of this request is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. § 1.22(b).

14. Authorization To Charge Additional Fees

WARNING: *If no fees are to be paid on filing, the following items should not be completed.*

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.*

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 02-4345 :

☒ 37 C.F.R. § 1.16(a), (f) or (g) (filing fees)

☐ 37 C.F.R. § 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☐ 37 C.F.R. § 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☐ 37 C.F.R. § 1.17(a)(1)–(5) (extension fees pursuant to § 1.136(a)).

☐ 37 C.F.R. § 1.17 (application processing fees)

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: See 37 C.F.R. § 1.28.

15. ☒ **Additional Enclosures**

Acknowledgment postcard

Reg. No.: 24,810

Tel. No.: (713) 266-5593

Customer No.:

SIGNATURE OF PRACTITIONER

C. James Bushman

(type or print name of practitioner)

Browning Bushman

P.O. Address

5718 Westheimer, Suite 1800

Houston, TX 77057

Practitioner's Docket No. Clearstrm-6 **PATENT**

REISSUE APPLICATION BY THE INVENTOR, OFFER TO SURRENDER (37 C.F.R. § 1.178)

To the Assistant Commissioner for Patents:

1. The undersigned applicant of the accompanying reissue application for the reissue of letters patent for the improvement in CURRENT AND AERATION SYSTEM FOR WASTEWATER PLANT Patent number 5,785,854 granted to him/her on July 29, 1998, of which

☒ he/she is now sole owner,

☐ _____

is now sole owner by assignment, and on whose behalf and with whose assent the accompanying application is made,

☐ The "ASSENT BY THE ASSIGNEE" to this reissue application is attached.

hereby offers to surrender the original patent upon granting of the reissue application.

Date: 7-15-00

Signature(s)

Jerry McKinney

(type or print name(s))

CERTIFICATION UNDER 37 C.F.R. § 1.10*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this correspondence and the documents reffered to as attached therein are being deposited with the United States Postal Service on this date _____, in an envelope as "Express Mail Post Office to Addressee," service under 37 C.F.R. § 1.10, Mailing Label Number EL362272395US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

_____

(type or print name of person mailing paper)

_____

Signature of person mailing paper

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

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*"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.*

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) AND 1.27 (b)) - INDEPENDENT INVENTOR	Docket No. **Clearstrm-6**

Serial No.	Filing Date	Patent No.	Issue Date
To Be Assigned	**Herewith**		

Applicant/ Patentee: **Jerry McKinney**

Invention: **Current and Aeration System for Wastewater Plant**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled above and described in:

- ☒ the specification to be filed herewith.
- ☐ the application identified above.
- ☐ the patent identified above.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ No such person, concern or organization exists.
- ☐ Each such person, concern or organization is listed below.

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR 1.27)

FULL NAME _____

ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME _____

ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME _____

ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME _____

ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF INVENTOR **Jerry McKinney**
SIGNATURE OF INVENTOR ______ DATE: 7-15-00

NAME OF INVENTOR ______
SIGNATURE OF INVENTOR ______ DATE: ______

NAME OF INVENTOR ______
SIGNATURE OF INVENTOR ______ DATE: ______

NAME OF INVENTOR ______
SIGNATURE OF INVENTOR ______ DATE: ______

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NAME OF INVENTOR ______
SIGNATURE OF INVENTOR ______ DATE: ______

NAME OF INVENTOR ______
SIGNATURE OF INVENTOR ______ DATE: ______

REISSUE APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Jerry McKinney	§	Attorney Docket No.: Clearstrm-6
		§	
Patent No.:	5,785,854	§	
		§	
Issued:	July 28, 1998	§	
		§	
For:	*Current and Aeration System for Wastewater Plant*	§	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Box REISSUE
Washington, DC 20231

Sir:

Kindly amend the above-identified application for reissue as follows:

In the Specification

Kindly amend the specification as follows:

In column 3, line 32, after the first occurrence of the article "the" insert the phrase --substantially flat--.

In column 3, line 32, after the second occurrence of the article "the" insert the word --cylindrical--.

In column 3, line 60, after the word "inlet" please add the following sentence:

> --Thus, the diffuser system, if comprised of multiple diffusers, is positioned such that the individual diffusers are in sufficiently close proximity to one another and adjacent the intersection of the side wall and the bottom wall such that the upwardly generated wastewater currents induce a branched current at the surface of

the liquid in the aeration chamber, the branched current having a first run that moves in a first direction around the periphery of the aeration chamber and a second run that moves in the opposite direction around the periphery of the aeration chamber, the first and second runs meeting in an area generally diametrically opposite the inception of the branched current.--

In column 5, line 37, after the word "pattern" please add the following sentences:

--As depicted in Figs. 1 and 6, the air injection source, e.g., a diffuser system, generates an area of aerating bubbles adjacent the intersection of the side wall and the bottom wall that induces the current flow shown in Figs. 1 and 6. Thus, assuming that direction 100 in Fig. 1 depicts the current flow of the wastewater induced at an injection area adjacent the intersection of the side wall and the bottom wall of the aeration chamber, a branched current having runs indicated by 102 and 104 is produced. Accordingly, multiple aeration sources, e.g., multiple diffusers 40, could be positioned in sufficient proximity to one another such that upward current flows from the injection area produced the flow paths indicated by 102 and 104.--

In the Claims

Please cancel Claim 2.

Please amend Claims 1-4 and 7-10 as follows:

1. **(Amended)** In an aerobic wastewater treatment plant comprising:

a vessel defining an aeration chamber and having a substantially flat bottom wall and a cylindrical side wall,

[an] said aeration chamber containing aerobic bacteria into which wastewater containing organic solids flows to be exposed to aerobic bacteria to convert the organic solids in the wastewater to water and CO_2[, said aeration chamber having a bottom and side walls],

[means] an aeration system [for injecting an oxygenation gas into the wastewater] in the aeration chamber to support growth of the aerobic bacteria, and

a clarifier chamber formed in said vessel and into which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant, said clarifier chamber being defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber,

the improvement [comprising a diffuser] wherein said aeration system [for releasing the oxygenation gas as bubbles into the aeration chamber of the wastewater treatment plant, said diffuser] forms an aeration area adjacent the intersection of the bottom and side walls of the vessel and [providing] provides sufficient flow such that all solids suspended within the plant are forced into circulation, [said diffuser being placed close to the bottom of the aeration chamber of the wastewater treatment plant and close to the side wall of the aeration chamber,] said [diffuser] aeration system providing sufficient oxygenation gas to allow the aerobic bacteria to convert the wastewater into CO_2 and water.

3. **(Amended)** The wastewater treatment plant of claim [2] 1, wherein the released oxygenation gas from the aeration area produces a wastewater current in the aeration chamber, the current flowing upwardly from a position of the [diffuser] aeration system in a direction

[perpendicular to] upwardly from the bottom wall of the [aeration chamber] vessel and [parallel to] along the side wall of the [aeration chamber] vessel, then around the partition which defines the clarifier chamber, then downwardly along the opposite side wall to the bottom and then across the bottom wall under the opening to the clarifier chamber and around the side wall of the [aeration chamber] vessel adjacent the bottom wall of the [chamber] vessel to keep solids from settling on the bottom of the aeration chamber.

4. **(Amended)** The wastewater treatment plant of claim 3 wherein said oxygenation gas injecting means further comprises:

a drop line having a first end attached to an external oxygenation source and a second end open to dispense oxygenation gas received from the external oxygenation gas source, said second end being attached to said [diffuser] aeration system.

7. **(Amended)** In an aerobic wastewater treatment plant comprising:

a vessel having a substantially flat, bottom wall and a cylindrical side wall and defining an aeration chamber into which the wastewater flows to be exposed to aerobic bacteria to convert the organic solids in the wastewater to water and CO_2, [said aeration chamber having a bottom and side walls,]

means for injecting an oxygenation gas into the wastewater in the aeration chamber to support growth of the aerobic bacteria, and

a clarifier chamber in which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant, said clarifier chamber being defined by a partition disposed in said vessel, said partition being in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber,

the improvement comprising means to generate a wastewater current in the aeration chamber[, the current flowing upwardly from] at a position close to the bottom and the side wall of the [aeration chamber,] vessel, the current flowing upwardly in a direction perpendicular to the bottom wall of the [aeration chamber] vessel and parallel to the side wall of the [aeration chamber] vessel, then around the partition which defines the clarifier chamber, then downwardly along the opposite side wall to the bottom and then across the bottom under the opening to the clarifier chamber and around the side wall of the [aeration chamber] vessel adjacent the bottom wall of the [chamber] vessel to keep solids from settling on the bottom of the aeration chamber.

8. **(Amended)** The method of creating a wastewater current inside an aeration chamber of a wastewater treatment plant, said aeration chamber being formed by a vessel having a substantially flat, bottom wall and a cylindrical side wall[s], comprising [the step of]:

injecting an oxygenation gas at a position adjacent the intersection of the bottom wall and the side wall of said vessel such that a wastewater current is produced in the aeration chamber, the current flowing upwardly [from a position close to the bottom and side wall of the aeration chamber] in a direction perpendicular to the bottom wall of the [aeration chamber] vessel and parallel to the side wall of the [aeration chamber] vessel, then around [the] a partition which defines a clarifier chamber, then downwardly along the opposite side wall to the bottom and then across the bottom under an opening to the clarifier chamber and around the side wall of the [aeration chamber] vessel adjacent the bottom of the aeration chamber to keep solids from settling on the bottom of the aeration chamber.

9. **(Amended)** An aerobic wastewater treatment plant comprising:

an aeration chamber containing aerobic bacteria into which wastewater containing aerobic bacteria into which wastewater containing organic solids flows to be exposed to aerobic bacteria

to convert the organic solids in the wastewater to water and CO_2, said aeration chamber having a substantially flat, bottom wall and a cylindrical side wall[s],

means for injecting an oxygenation gas into the wastewater in the aeration chamber to support growth of the aerobic bacteria,

a clarifier chamber into which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant, said clarifier chamber being defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber,

[a diffuser] an aeration system for releasing the oxygenation gas as bubbles into the aeration chamber of the wastewater treatment plant, said [diffuser] aeration system providing sufficient flow such that all solids suspended within the plant are forced into circulation, said [diffuser] aeration system being placed close to the bottom of the aeration chamber of the wastewater treatment plant and close to the side wall of the aeration chamber, said [diffuser] aeration system providing sufficient oxygenation gas to allow the aerobic bacteria to convert the wastewater into CO_2 and water.

10. **(Amended)** An aerobic wastewater treatment plant comprising:

an aeration chamber into which the wastewater flows to be exposed to aerobic bacteria to convert the organic solids in the wastewater to water and CO_2, said aeration chamber having a substantially flat, bottom wall and a cylindrical side wall[s],

means for injecting an oxygenation gas into the wastewater in the aeration chamber to support growth of the aerobic bacteria,

a clarifier chamber in which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant,

said clarifier chamber being defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber, and

means for generating a wastewater current in the aeration chamber in an area adjacent the intersection of said side wall and said bottom wall, the current flowing upwardly from [a position close to the bottom and the side wall of the aeration chamber] said area in a direction perpendicular to the bottom of the aeration chamber and parallel to the side wall of the aeration chamber, then around the partition which defines the clarifier chamber, then downwardly along the opposite side wall to the bottom and then across the bottom under the opening to the clarifier chamber and around the side wall of the aeration chamber adjacent the bottom of the chamber to keep solids from settling on the bottom of the aeration chamber.

Please add the following new claims, 11-24.

--11. An aeration apparatus for use in an aerobic wastewater treatment plant, comprising:

a vessel defining an aeration chamber, said vessel comprising a cylindrical side wall and a substantially flat, bottom wall,

an inlet into said aeration chamber,

a partition positioned in said vessel and defining a clarifier chamber, said partition being in the form of an inverted, truncated cone having a bottom opening facing said bottom wall,

an outlet from said clarifier, and

an injection system in said aeration chamber, said injection system creating an injection area adjacent the intersection of said side wall and said bottom wall, and

a source of air for said injection system.

12. The aeration apparatus of claim 11, wherein said injection system comprises at least one diffuser disposed adjacent the intersection of said side wall and said bottom wall, said diffuser being connected to said source of air.

13. The aeration apparatus of claim 11 wherein said injection system comprises multiple diffusers disposed adjacent the intersection of said side wall and said bottom wall, said diffusers being connected to said source of air.

14. The aeration apparatus of claim 12, wherein a tubular line is connected between said diffuser and said source of air.

15. The aeration apparatus of claim 13, wherein there are tubular lines connected between said diffuser and said source of air.

16. The aeration apparatus of claim 14 or 15 wherein there are rigid conduits mounted to the inside of said vessel and said tubular lines extend through said rigid conduits.

17. The wastewater treatment plant of claim 1 wherein said diffuser system comprises multiple diffusers.

18. The wastewater treatment plant of claim 7 wherein said means to generate said current comprises a diffuser system for creating an injection area adjacent the intersection of said side wall and said bottom wall.

19. The wastewater treatment plant of claim 18 wherein said diffuser system comprises multiple diffusers.

20. The method of claim 8 wherein injection of said oxygenation gas is through a diffuser system.

21. The method of claim 20 wherein injection of said oxygenation gas is through multiple diffusers.

22. The wastewater treatment plant of claim 9 wherein said [diffuser] aeration system comprises multiple diffusers.

23. The wastewater treatment plant of claim 10 wherein said means for generating said current comprises a diffuser system.

24. The wastewater treatment plant of claim 23 wherein said diffuser system comprises multiple diffusers.--

Respectfully submitted,

C. James Bushman
Reg. No. 24,810

Date: 7/17/00

Browning Bushman
5718 Westheimer, Suite 1800
Houston, TX 77057
Tel.: (713) 266-5593
Fax: (713) 266-5169

CERTIFICATE OF EXPRESS MAILING

I, Jan C. Lipscomb, hereby certify that this correspondence and all referenced enclosures are being deposited by me with the United States Postal Service as Express Mail with Receipt No. EL362272395US in an envelope addressed to the Assistant Commissioner for Patents, Box Reissue, Washington, DC 20231, on July 17, 2000.

By: Jan C. Lipscomb

1

CURRENT AND AERATION SYSTEM FOR WASTEWATER PLANT

BACKGROUND OF THE INVENTION

This invention relates to an improved system for supplying air to the aeration chamber of an aerobic wastewater treatment plant.

In remote areas, newly developed subdivisions, or other locations where a municipal sewer system is not available, small anaerobic or aerobic wastewater treatment plants are used to handle the wastewater produced. Septic tanks use anaerobic bacteria to convert the organic solid waste in the wastewater stream. Usually, however, most of the organic solids settle as sludge to the bottom of the septic tank and must be pumped out periodically.

Aerobic wastewater treatment plants use "extended aeration" to efficiently encourage aerobic bacteria growth. Extended aeration includes contacting the wastewater with a large number of small bubbles of oxygen-carrying gas, thus maximizing the surface area for oxygen transfer. Air or oxygen is generally pumped into the tank through diffusers that break up the air into thousands of tiny air bubbles. Aerobic bacteria in the water convert waste products to water and $C0_2$, thus purifying the water and reducing the wastewater to a clear odorless liquid. Through extended aeration, the home wastewater treatment plants accelerates the reduction of waste substantially beyond the rate of reduction which can be accomplished with an anaerobic septic tank or even the rate of reduction observed in nature.

One problem associated with aerobic wastewater treatment plants is the failure of the flow of air in the aeration chamber to keep some of the solids from continuously settling to the bottom, where they build up a layer of sludge in the aeration and clarifier chamber, requiring periodic removal. It is desirable that a minimum of sludge removal be required since, in addition to the high maintenance requirement, disposal of the sludge presents an ecological problem. An accumulation of sludge within the unit further results in a deterioration of the wastewater treatment process because the high concentration of bacteria in the sludge rapidly consumes the available oxygen in the immediately surrounding water, whereupon, the bacteria begins to break down nitrogen compounds in the sludge to release bonded oxygen. This results in a release of nitrogen gas, which rises to the surface producing scum and disrupting the bacterial conversion. Thus, bacteria and waste need be maintained in solution for optimum conversion.

The basic aerobic wastewater treatment plant for home use includes a tank which is buried in the ground except for the top opening which provides access to the inside of the tank. The tank is divided into an aeration chamber into which the wastewater flows, where oxygen is supplied to cause aerobic bacteria to digest the solids in the wastewater, and a clarifier chamber from which the treated wastewater exits the treatment plant. An external oxygen source is generally connected to a PVC line which drops through the top portion of the tank to the bottom of the tank in the aeration chamber.

There are two basic designs of these treatment plants known in the art which are devised to retain solids in the aeration chamber until they can be broken down by bacteria. The first design includes two substantially rectangular chambers separated by a baffle or partition extending from the top of the plant a substantial length down through the plant. Wastewater must flow under this baffle to reach the clarifier chamber. A deflector directing errant solids out of the

clarifier chamber back into the aeration chamber is a frequent element in this type of plant.

The second basic design of treatment plants includes a partition that is shaped like an inverted, truncated cone. This partition divides the tank into the two chambers, an outer aeration chamber and an inner clarifier chamber. This design may also incorporate a pyramid shaped deflector placed beneath the truncated conical partition to deflect solids settling out of the clarifier chamber back into the aeration chamber for further bacterial digestion.

Any solids remaining in the wastewater entering the clarifier chamber are expected to be converted by the bacteria in the clarifier chamber before the water reaches the outlet. Since this does not always happen, it is best to minimize the amount of solids reaching the clarifier chamber by efficiently exposing all solids in the aeration chamber to bacterial digestion and avoiding solid accumulation in the form of sludge.

Wastewater treatment plants of all shapes suffer from an accumulation of sludge in the tank. Sludge accumulates due to circulatory "dead spots" in the tank where the fluid does not flow. Dead spots may occur in corners of vessels due to the circulation pattern achieved in the vessel. Dead spots may also occur with the use of diffusers in two or more locations due to the interference pattern produced in the circulation or currents by the diffusers. It has been determined, that sludge tends to accumulate at the base of deflectors and, even worse, directly below the clarifier chamber. As discussed previously, sludge build-up results in the release of nitrogen gas. When the sludge is below the clarifier chamber, the nitrogen bubbles up into the clarifier chamber producing scum and interfering with the operation of the clarifier.

While the use of diffusers in multiple locations necessarily creates the problem of circulatory dead spots where sludge accumulates, this problem is accentuated since air entering into multiple lines is not emitted evenly. The air tends to come out more from one diffuser that the other, particularly if the tank is slightly tilted.

Current U.S. Pat. Nos. 4,664,795 and 4,834,879 by William A. Stegall et al issued May 12, 1987 and May 30, 1989 respectively, disclose the use of a diffuser in the rectangular-shaped treatment plant such that the placement of the diffuser opposite of the baffle and deflector set up a circular pattern in the aeration chamber specifically to avoid the migration of solids into the clarifier chamber. The drop line delivering air to the diffuser is placed directly below the inlet to the wastewater treatment plant and close to the bottom of the plant. The position of the diffuser creates a rolling pattern such that fluid carrying solids moves away from the opening of the clarifier chamber. Sludge build-up in low- or no-circulation zones is not addressed, but the circulation pattern as demonstrated in the drawing, while sweeping the bulk of the fluids into motion, does not sweep into the corners of the chamber. Presumably, this is where sludge build-up occurs.

U.S. Pat. No. 5,266,239 issued to T. Gig Drewery on Nov. 30, 1993, discusses the use of a wastewater treatment plant with an truncated, inverted conical partition having three drop lines for air, as shown in the drawings. The drop lines with diffusers for releasing air are spaced circumferentially and placed near the bottom of the plant. The diffusers create a current including three rolling patterns. The patent drawings show downwardly sweeping necessitated by the interference pattern of the neighboring diffusers. This creates multiple dead zones on the bottom of the aeration chamber.

With the use of multiple diffusers, one such dead zone is created directly beneath the clarifier chamber.

U.S. Pat. No. 5,221,470 from the current Applicant, Jerry L. McKinney, issued Jun. 22, 1993, discloses a treatment plant having an inverted truncated conical partition and a pyramidshaped deflector below. One of the inventions of this patent is the use of rigid conduits through which flexible air hoses extend to discharge air adjacent to the bottom of the aeration chamber. These rigid conduits are attached to the plant wall and extend vertically towards the bottom of the plant. The use of two diffusers creates interference patterns similar to those exhibited in the Drewery patent.

It is a feature of this invention to minimize or eliminate sludge build up in a wastewater treatment plant.

It is a further feature of this invention to create an improved current in a wastewater treatment plant that sweeps all solids into circulation to prevent solids from accumulating in a wastewater treatment plant.

It is a further feature of this invention to position an air diffuser in a single location in the aeration chamber of a wastewater treatment plant to create currents in the wastewater in the tank that will maintain all solids in circulation with the wastewater.

These and other objects, advantages, and features of this invention will be apparent to those skilled in the art from a consideration of this specification including the attached drawings and appended claims.

BRIEF SUMMARY OF THE INVENTION

The introduction of diffused oxygenation gas or air in a single location close to the bottom and the side wall of an aeration chamber produces a defined current or circulation pattern which generally maintains all solids in circulation and forces all fluid within a wastewater treatment plant into motion, overcoming dead spots created by interference patterns when two or more diffuser locations are used. The diffuser location close to the side wall and the bottom of the aeration chamber of the wastewater treatment plant forces a specific current or pattern of circulation which sweeps fluid from every portion of the plant such that solids will remain well mixed in solution instead of accumulating as sludge. This exposes all solids to efficient digestion by aerobic bacteria. In a preferred embodiment, an external oxygenation gas source supplies oxygenation gas, preferably air, through a flexible drop line or air line to the diffuser for release into the aeration chamber. The release of oxygenation gas at the diffuser location forces the defined current pattern in the tank while providing a sufficient supply of oxygen for the growth of the aerobic bacteria which digests the organic solid wastes. While the diffuser location can be a single location close to the side wall and near the bottom of the wastewater treatment plant, a preferred embodiment includes placing the diffuser close to the side wall and close to the bottom such that the diffuser is substantially below the wastewater treatment plant inlet. When multiple air lines and diffusers must be used to provide sufficient quantities of oxygen, a preferred embodiment includes grouping all drop lines and diffusers in close proximity below the wastewater treatment plant inlet.

A preferred embodiment of the current invention includes the use of an aerobic wastewater treatment plant with an inverted truncated conical partition dividing the aeration chamber from the clarifier chamber. A preferred embodiment uses no deflector under the clarifier chamber. The diffuser forces a pattern of circulation which produces exposure to oxygen to all fluid in the aeration chamber as

shown in FIG. 4 and minimizes the formation and depositing of sludge on the bottom of the plant.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an isometric view demonstrating the complete current or circulation pattern established within the wastewater treatment plant of a preferred embodiment.

FIG. 2 is a vertical sectional view through a preferred embodiment of the treatment plant of this invention.

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2 showing a single air line connected to a diffuser.

FIG. 4 is a plan view of the current or circulation pattern established within the wastewater treatment plant of a preferred embodiment.

FIG. 5 is an elevation view of the current or circulation pattern established within the wastewater treatment plant of a preferred embodiment.

FIG. 6 is an elevation view of the air released from the diffuser forcing the wastewater into the defined current or circulation pattern.

FIG. 7 is a 90 degree elevation demonstrating, as in FIG. 6, the air released from the diffuser forcing the wastewater into the defined current or circulation pattern.

So that the manner in which the above recited features, advantages, and objectives of this invention, as well as others which will become apparent, are attained and can be understood in detail, more particular description of the invention briefly summarized above may be had by reference to the embodiments thereof which are illustrated in the drawings, which drawings form a part of the specification. It is to be noted, however, that the appended drawings illustrate only preferred embodiments of the invention and are, therefore, not to be considered limiting of the invention's scope, for the invention may admit to other equally effective embodiments.

DETAILED DESCRIPTION OF THE INVENTION

The water treatment plant of a preferred embodiment shown in the drawings includes cylindrical tank **10** with dome-shaped upper end **12**. Opening **14** is located in the upper end to provide access to the inside of the tank. Usually, the tank is buried in the ground so that only opening **14** and its cover **15** are above ground.

Inside the tank is partition **18** that is shaped like an inverted, truncated, cone. The upper end of the partition is attached to dome-shaped upper end **12**. This partition divides the tank into two chambers, aeration chamber **20** and clarifier chamber **22**.

In operation, wastewater from the residence or facility to which the plant is connected enters the aeration chamber through inlet **24**. Flow through the plant is a result of hydrostatic pressure. The water entering inlet **24** will increase the hydrostatic head in aeration chamber **20** causing water to flow into opening **26** in the bottom of the clarifier chamber. This causes the water in the clarifier chamber to move upwardly and exit through outlet pipe **30**.

In a preferred embodiment of the current invention, air or other oxygenation gas is supplied to aeration chamber **20** through flexible drop line **38** connected to diffuser **40** supported by rigid conduit **32**. Rigid conduit **32** is mounted on partition **18** which defines clarifier chamber **22** and the rigid conduit extends downwardly into aeration chamber **20** to a position close to the bottom of the chamber and close to

side wall **50**. This conduit is supported by conduit brackets **34** and is held in the position shown by the conduit brackets and openings **36** in partition **18** through which the conduit extends downwardly into the aeration chamber as shown in FIG. **3**. Positioned in rigid conduit **32** is flexible drop line **38** through which air is supplied to diffuser **40** connected to the end of the flexible drop line.

In the embodiment shown in FIG. **3**, one flexible drop line is shown delivering air to aeration chamber **20**. Air is supplied to the flexible drop line from the external oxygenation source, preferably an air compressor.

The defined current or circulation pattern produced by this embodiment, as shown in FIG. **1**, is such that oxygenation gas forces the fluid within the aeration chamber to move upwards in direction **100** from the diffuser until it reaches the surface of the liquid within the chamber. This forces a current which travels around the conical partition in both direction, as indicated by the numbers **102** and **104**. As these currents meet on the opposite side of the partition, the intersection of the outer currents cause a downwardly flowing current **106** which flows to the bottom of the aeration chamber which creates main currents **108**, **110**, and **112** that sweep across the bottom in all directions. The water sweeping generally in a straight line across the bottom of the vessel in direction **108** moves with the greatest speed and serves to move any solid falling out of clarifier chamber back into circulation in the aeration chamber, thus preventing any accumulation of solids in the bottom of the aeration chamber. The water moving generally around the outer perimeter of the vessel in directions **110** and **112** moves at a slower speed but with enough speed to scour the edges of the vessel and to sweep the solids into circulation. All areas of the bottom of the vessel are forced into circulation. Those areas intermediate between the path straight across the bottom of the vessel and the path around the outer perimeter travel at respectively intermediate speeds. While FIG. **1** shows the entire circulation pattern, FIG. **5–7** show different views of parts of this pattern.

While the wastewater in the aeration chamber is thus forced into circulation, the clarifier chamber remains largely undisturbed. Fluid rises in the clarifier chamber in direction **114** as a result of hydrostatic head. The defined current produced by the introduction of oxygenated gas, flows across the opening of the inverted, truncated cone defining the clarifier chamber in direction **116** but does not flow into the clarifier chamber. Thus the clarifier chamber has reduced turbulence, while the aeration chamber bacteria effectively digest the solid particles from the wastewater. Treated wastewater rises through the clarifier chamber and exits the plant through an outlet pipe.

The diffuser is located close to the bottom of the plant, preferably within 3 to 4 inches from the bottom, and close to the side wall of the tank in order to produce the desired current. Placing the diffuser closer to the center causes the air to hit the conical partition, thus changing the pattern. Such placement also causes the tiny bubble to coalesce into larger bubbles along the partition, thus reducing the aeration effect. If the diffuser is placed too far above the bottom of the tank, then sludge will accumulate beneath the diffuser on the bottom of the tank.

Experimentation was conducted on a base case of a 850 gallon tank using one air diffuser at [x] psig and [y] flow rate. The current pattern described above was observed. The current sweeps up the side wall above the diffuser in direction **100**, around the partition in directions **102** and **104**, down the opposite side wall in direction **106**, and across the

bottom in directions **108**, **110**, and **112**. It can be observed that the flow turns below the truncated conical partition creating slight suction which pulls solids out of the bottom of the clarifier chamber by this action. Thus, the defined current not only mixes the solids and water for maximum digestion of the waste such that fewer particles are available to enter the clarifier chamber, but the current also serves to pull solids out of the bottom of the clarifier chamber for further digestion in the aeration chamber.

When a diffuser plugs up or for whatever reason a drop line needs to be removed for repair or replacement, the drop line is discovered from the external oxygenation gas source, such as an air compressor, and simply pulled out of the rigid conduit in which it is located and out of the tank through opening **14**. The new or repaired hose and diffuser can then be threaded back through the rigid conduit and reconnected to the air compressor.

Another preferred embodiment includes the use of multiple diffusers all of which are placed generally below the inlet to the wastewater tank close to the bottom. This allows the introduction of a higher volume of oxygenation gas while creating the circulation or current pattern of the invention. To equalize the pressure between the multiple diffusers, a pressure regulator such as a choke valve can be utilized. This assures an equal amount of oxygenation gas flowing to each diffuser.

Another preferred embodiment includes releasing the oxygenation gas through a diffuser located close to the bottom and close to the side wall of the wastewater treatment plant by delivering oxygenation gas directly through the bottom or side of the wastewater treatment plant into the aeration chamber.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus and structure.

Because many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

For example, oxygenation gas can be delivered in many ways to the diffuser location close to the bottom and the side wall of the aeration chamber of the wastewater treatment plant. In addition to the drop lines, aeration pipes or the like can be used. The release of the oxygenation gas to create the circulation pattern of this invention encompasses all such deliveries.

Likewise, while a diffuser is used to release the oxygenation gas or air so as to encourage bacteria growth and to force the circulation, other emitters or components can be used to produce this desired effect. By releasing the oxygenation gas in such an amount and at such a location as to create the circulation pattern of this invention, such substitute components are encompassed within this invention.

The above examples are illustrative and are to be understood as non-limiting as to the scope of the invention.

What is claimed is:

1. In an aerobic wastewater treatment plant comprising:

an aeration chamber containing aerobic bacteria into which wastewater containing organic solids flows to be exposed to aerobic bacteria to convert the organic solids in the wastewater to water and CO_2, said aeration chamber having a bottom and side walls,

means for injecting an oxygenation gas into the wastewater in the aeration chamber to support growth of the aerobic bacteria, and

a clarifier chamber into which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant, said clarifier chamber being defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber,

the improvement comprising a diffuser for releasing the oxygenation gas as bubbles into the aeration chamber of the wastewater treatment plant, said diffuser providing sufficient flow such that all solids suspended within the plant are forced into circulation, said diffuser being placed close to the bottom of the aeration chamber of the wastewater treatment plant and close to the side wall of the aeration chamber, said diffuser providing sufficient oxygenation gas to allow the aerobic bacteria to convert the wastewater into CO_2 and water.

2. The wastewater treatment plant of claim 1, wherein the wastewater treatment plant has a substantially flat bottom.

3. The wastewater treatment plant of claim 2, wherein the released oxygenation gas produces a current in the aeration chamber, the current flowing upwardly from a position of the diffuser in a direction perpendicular to the bottom of the aeration chamber and parallel to the side wall of the aeration chamber, then around the partition which defines the clarifier chamber, then downwardly along the opposite side wall to the bottom and then across the bottom under the opening to the clarifier chamber and around the side wall of the aeration chamber adjacent the bottom of the chamber to keep solids from settling on the bottom of the aeration chamber.

4. The wastewater treatment plant of claim 3 wherein said oxygenation gas injecting means further comprises

a drop line having a first end attached to an external oxygenation source and a second end open to dispense oxygenation gas received from the external oxygenation gas source, said second end being attached to said diffuser.

5. The wastewater treatment plant of claim 4 wherein said oxygenation gas injecting means further comprises

a rigid conduit mounted to the inside of the wastewater treatment plant for receiving and firmly securing the drop line such that the drop line extends from the oxygenation source towards the bottom of the plant.

6. The wastewater treatment plant of claim 5 wherein said rigid conduit extends generally parallel to the partition and from there generally to the bottom of the wastewater treatment plant such that the rigid conduit is intimately connected to the partition.

7. In an aerobic wastewater treatment plant comprising

an aeration chamber into which the wastewater flows to be exposed to aerobic bacteria to convert the organic solids in the wastewater to water and CO_2, said aeration chamber having a bottom and side walls,

means for injecting an oxygenation gas into the wastewater in the aeration chamber to support growth of the aerobic bacteria, and

a clarifier chamber in which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant, said clarifier chamber being defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber,

the improvement comprising a current in the aeration chamber, the current flowing upwardly from a position close to the bottom and the side wall of the aeration

chamber in a direction perpendicular to the bottom of the aeration chamber and parallel to the side wall of the aeration chamber, then around the partition which defines the clarifier chamber, then downwardly along the opposite side wall to the bottom and then across the bottom under the opening to the clarifier chamber and around the side wall of the aeration chamber adjacent the bottom of the chamber to keep solids from settling on the bottom of the aeration chamber.

8. The method of creating a current inside an aeration chamber of a wastewater treatment plant, said aeration chamber having a bottom and side walls, comprising the step of

injecting an oxygenation gas such that a current is produced in the aeration chamber, the current flowing upwardly from a position close to the bottom and side wall of the aeration chamber in a direction perpendicular to the bottom of the aeration chamber and parallel to the side wall of the aeration chamber, then around the partition which defines a clarifier chamber, then downwardly along the opposite side wall to the bottom and then across the bottom under an opening to the clarifier chamber and around the side wall of the aeration chamber adjacent the bottom of the aeration chamber to keep solids from settling on the bottom of the aeration chamber.

9. An aerobic wastewater treatment plant comprising:

an aeration chamber containing aerobic bacteria into which wastewater containing organic solids flows to be exposed to aerobic bacteria to convert the organic solids in the wastewater to water and CO_2, said aeration chamber having a bottom and side walls,

means for injecting an oxygenation gas into the wastewater in the aeration chamber to support growth of the aerobic bacteria,

a clarifier chamber into which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant, said clarifier chamber being defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber,

a diffuser for releasing the oxygenation gas as bubbles into the aeration chamber of the wastewater treatment plant, said diffuser providing sufficient flow such that all solids suspended within the plant are forced into circulation, said diffuser being placed close to the bottom of the aeration chamber of the wastewater treatment plant and close to the side wall of the aeration chamber, said diffuser providing sufficient oxygenation gas to allow the aerobic bacteria to convert the wastewater into CO_2 and water.

10. An aerobic wastewater treatment plant comprising

an aeration chamber into which the wastewater flows to be exposed to aerobic bacteria to convert the organic solids in the wastewater to water and CO_2, said aeration chamber having a bottom and side walls,

means for injecting an oxygenation gas into the wastewater in the aeration chamber to support growth of the aerobic bacteria,

a clarifier chamber in which wastewater from the aeration chamber flows upwardly toward an outlet pipe through which the wastewater flows from the wastewater treatment plant, said clarifier chamber being defined by a partition in the form of an inverted, truncated cone into the bottom of which the wastewater flows from the aeration chamber, and

a current in the aeration chamber, the current flowing upwardly from a position close to the bottom and the side wall of the aeration chamber in a direction perpendicular to the bottom of the aeration chamber and parallel to the side wall of the aeration chamber, then around the partition which defines the clarifier chamber, then downwardly along the opposite side wall

to the bottom and then across the bottom under the opening to the clarifier chamber and around the side wall of the aeration chamber adjacent the bottom of the chamber to keep solids from settling on the bottom of the aeration chamber.

* * * * *

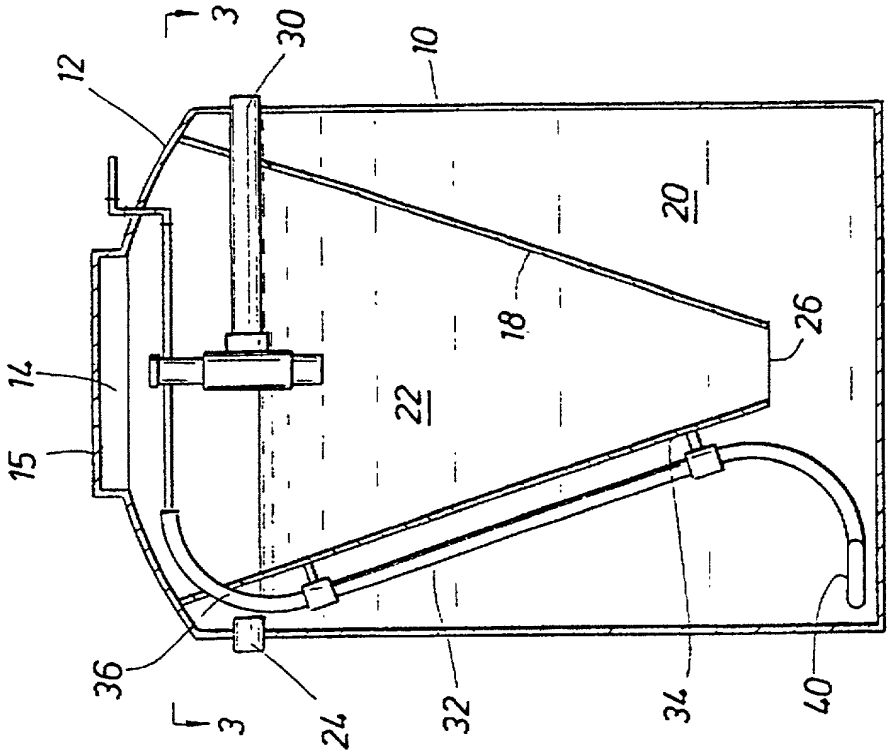
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FIG. 2

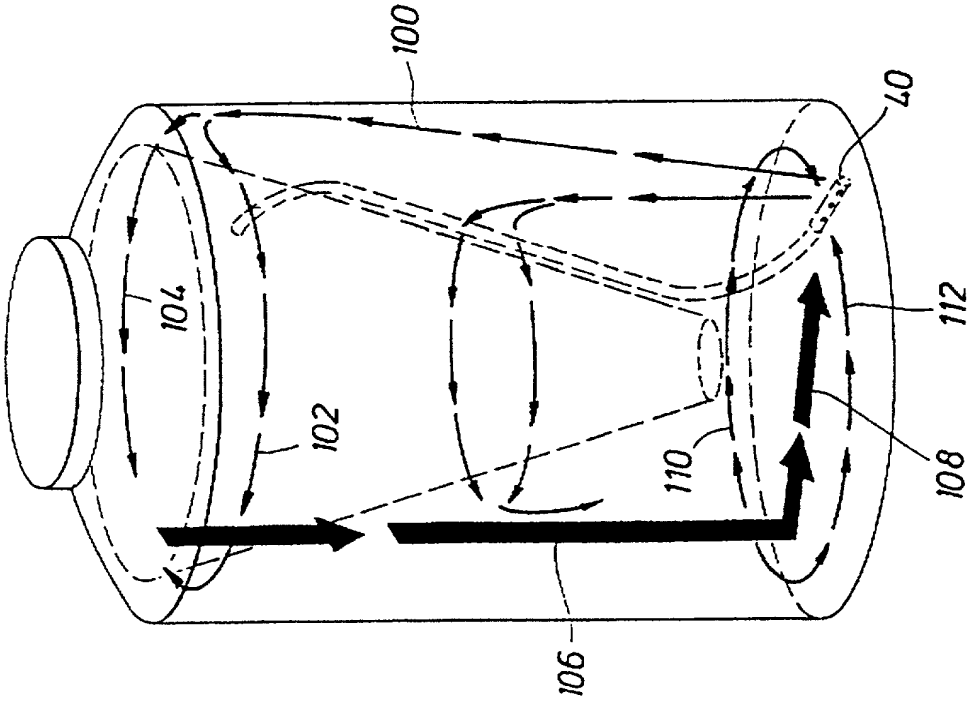
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FIG. 1

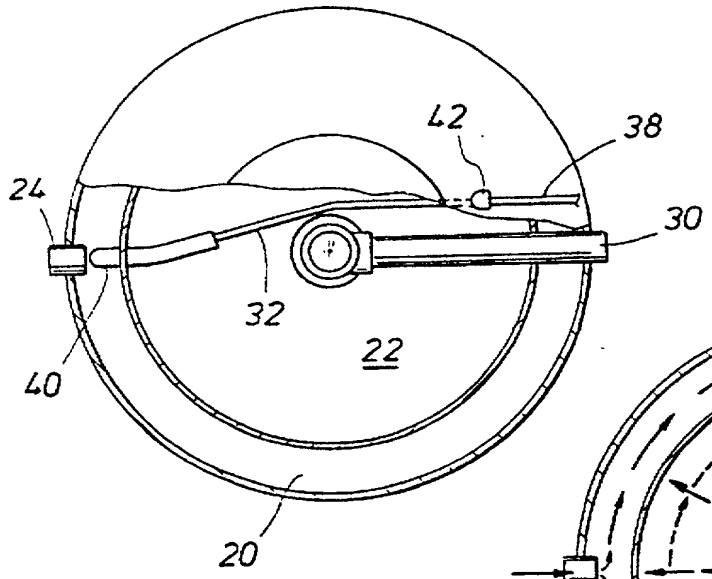


FIG. 3

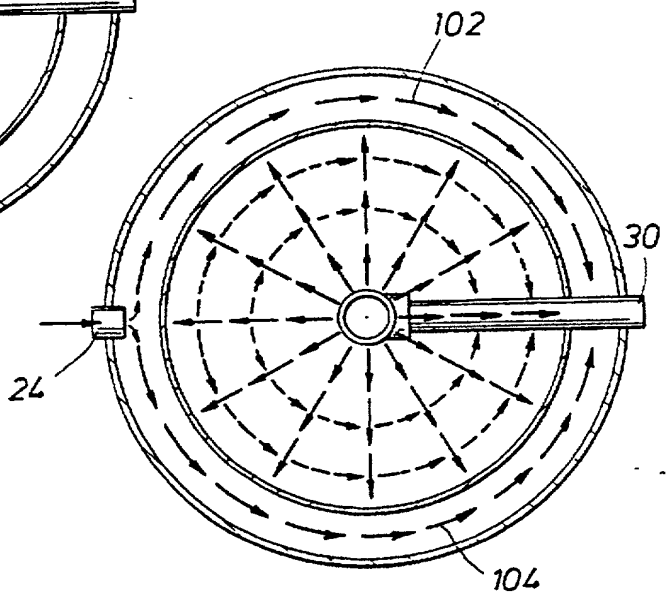


FIG. 4

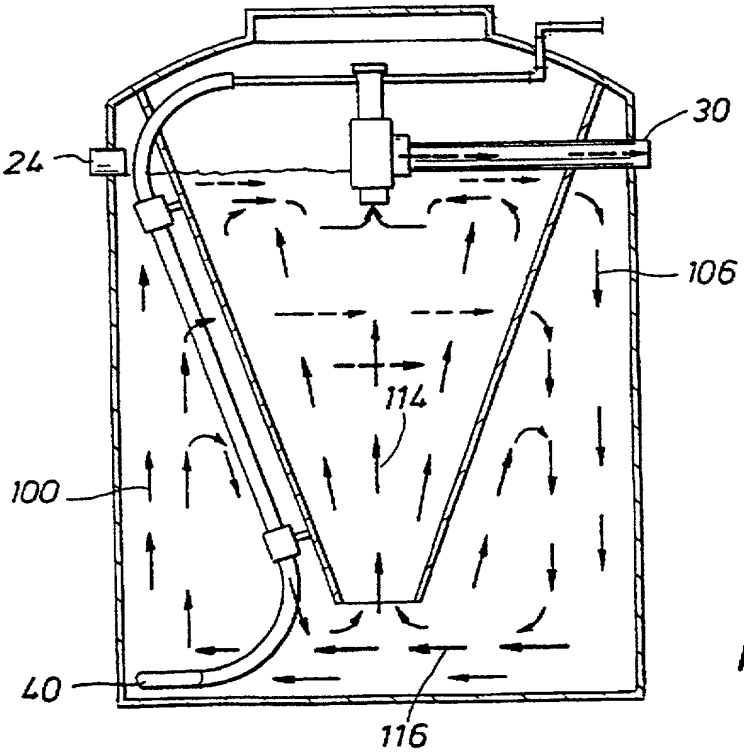


FIG. 5

FIG. 7

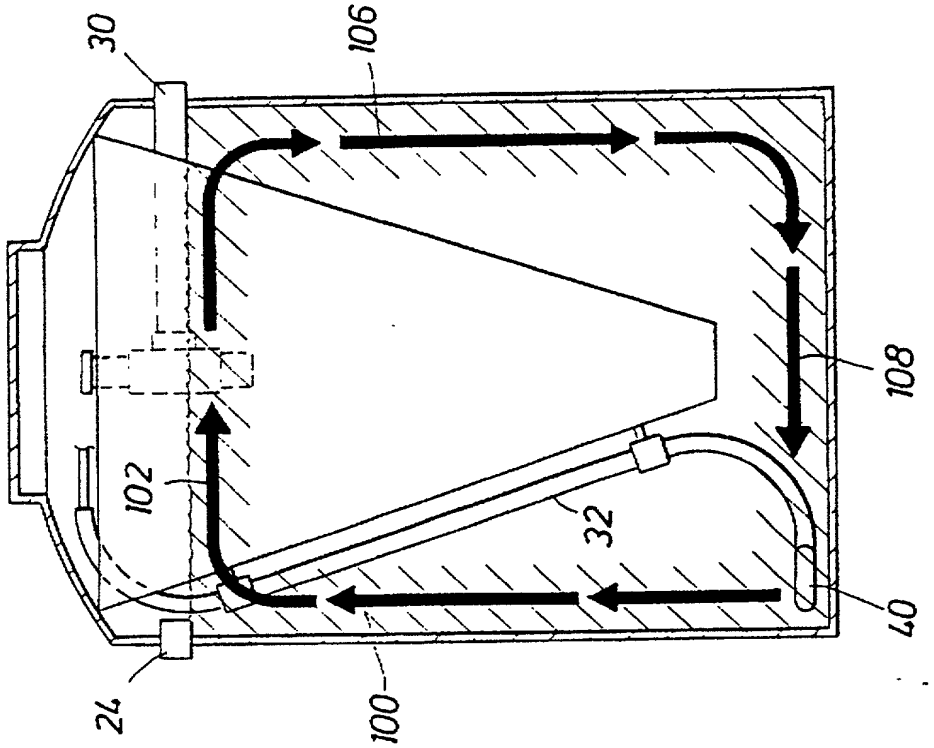
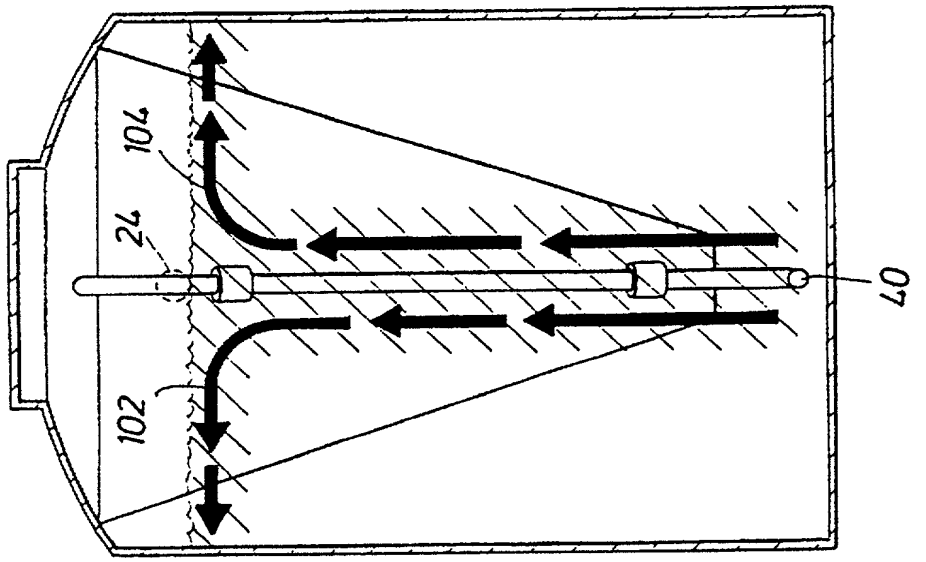


FIG. 6



Practitioner's Docket No. Clearstrm-6 **PATENT**

REISSUE APPLICATION DECLARATION AND POWER OF ATTORNEY (BY INVENTOR(S) OR ASSIGNEE)

(complete A or B)

A. ☒ DECLARATION BY THE INVENTOR(S)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor *(if only one name is listed below)* or an original, first and joint inventor *(if plural names are listed below)* of the subject matter that is described and claimed in letters patent number 5,785,854, granted on July 28, 1998, and for which invention I solicit a reissue patent on the invention entitled CURRENT AND AERATION SYSTEM FOR WASTEWATER PLANT

the specification of which

☒ is attached hereto.

☐ was filed on _____, as reissue application number / and was amended on _____ *(if applicable).*

☒ I hereby declare that there is no assignee for this application.

NOTE: "Where no assignee exists, applicant should affirmatively state that fact. If the file record is silent as to the existence of an assignee, it will be presumed that no assignee exists." M.P.E.P., 6th ed., rev. 1, § 1410.01.

B. ☐ DECLARATION BY ASSIGNEE

NOTE: The assignee of the entire interest may make the declaration, if the reissue application does not seek to enlarge the scope of the claims of the original patent. 37 C.F.R. § 1.172.

_____, _____,
(type or print name of declarant) Title

of _____,
Name of company or legal entity on whose behalf declarant is authorized to sign

declare that I am a citizen of _____ and resident of _____,

_____, that the entire title to letters patent number _____,

for _____,

granted on _____, 19____ to _____
Inventor(s)

is vested in _____
Name of company or legal entity

that I believe said named inventor(s) to be an original, first and sole inventor *(if only one name is listed)* or an original, first and part inventor *(if plural names are listed)* of the subject matter that is described and claimed in the aforesaid letters patent and in the foregoing specification and for which invention I solicit a reissue patent.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR
(37 C.F.R. § 1.175)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information that is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

☒ In compliance with this duty, there is attached an information disclosure statement in accordance with 37 C.F.R. § 1.98.

PRIORITY CLAIM

NOTE: A "claim" for the benefit of an earlier filing date in a foreign country under 35 U.S.C. 119(a)-(d) must be made in a reissue application even though such a claim was made in the application on which the original was granted. However, no additional certified copy of the foreign application is necessary. M.P.E.P., 6th ed., rev. 1, § 1417.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

(complete C or D)

C. ☒ No such applications have been filed.

D. ☐ Such applications have been filed as follows:

EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION

Country	Application No.	Date of filing (day, month, year)	Date of issue (day, month, year)	Priority Claimed
				☐ YES NO ☐
				☐ YES NO ☐
				☐ YES NO ☐

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION

BENEFIT OF PROVISIONAL APPLICATION

STATEMENT OF INOPERATIVENESS OR INVALIDITY OF ORIGINAL PATENT

(37 C.F.R. § 1.175)

That I believe the original patent to be

☒ partly

☐ wholly

inoperative or invalid by reason of (37 C.F.R. § 1.175(a)(1)):

(check all items that may apply)

☐ a defective specification

☐ a defective drawing

☒ the patentee claiming more or less than the patentee had a right to claim in the patent.

NOTE: At least one error must be relied upon as the basis for the reissue. 37 C.F.R. § 1.175(a)(1).

That the error listed above, which are being corrected, up to the time of the filing of this reissue declaration arose without any deceptive intention on the part of the applicant. (37 C.F.R. § 1.175(a)(2).

NOTE: For any error corrected not covered by this declaration applicant must submit, before allowance, a supplemental declaration stating that every such error arose without any deceptive intention on the part of the applicant. 37 C.F.R. § 1.175(b)(1).

☐ Corroborating affidavits or declarations of others accompany this declaration.

POWER OF ATTORNEY

I hereby appoint the following practitioner(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

(list name and registration number)

C. James Bushman, Reg. No. 24,810; Loren G. Helmreich, Reg. No. 29,389; Carlos A. Torres, Reg. No. 24,264; Marvin B. Eickenroht, Reg. No. 17,279; and Eugene N. Riddle, Reg. No. 18,541

(check the following item, if applicable)

☐ I hereby appoint the practitioner(s) associated with the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

☐ Attached, as part of this declaration and power of attorney, is the authorization of the above-named practitioner(s) to accept and follow instructions from my representative(s).

SEND CORRESPONDENCE TO

☒ Address
C. James Bushman
Browning Bushman
5718 Westheimer, Suite 1800
Houston, TX 77057

☐ Customer Number _____

DIRECT TELEPHONE CALLS TO:
(Name and telephone number)

C. James Bushman
713-266-5593

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signature(s)

☒ **BY THE INVENTOR(S)**

Full name of sole or first inventor Jerry McKinney

Inventor's signature _____

Date 7-15-00 Country of Citizenship United States of America

Residence Lumberton, Texas

Post Office Address 1202 North Main Street

Lumberton, Texas 77657

Full name of second joint inventor, if any _____

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

☐ **BY ASSIGNEE OR PERSON AUTHORIZED TO SIGN ON BEHALF OF ASSIGNEE**

NOTE: Even though inventor(s) do not sign, complete above information for inventor(s).

(complete the following, if applicable)

_____

(type name of assignee)

_____

Address of assignee

_____

_____

Title of person authorized to sign on behalf of assignee

☐ Assignment recorded in PTO on _____

Reel _____

Frame _____

☐ A separate ☐ "ASSIGNMENT (DOCUMENT) COVER SHEET" or ☐ FORM PTO 1595 is submitted herewith along with the assignment _____.